

CLAIMS:

1. A transportable cold/heat therapy apparatus for applying cold/heat therapy to one or more therapy sites on the human or mammalian body comprising:
  - a means to select and set a constant therapy temperature;
  - 5 a means to program and store one or more therapy temperature-time profiles;
  - a means to control the therapy temperature at a substantially constant value, or to follow with substantial accuracy a therapy temperature-time profile;
- 10 a means to measure and monitor with substantial accuracy the therapy temperature applied at the therapy site or sites;
- 15 a means to apply tactile stimulation at the therapy site or sites while controlling therapy temperature; and
- 20 a means to warn the user whenever the apparatus lacks sufficient cooling or heating capacity to control the therapy temperature at a constant value, or according to a therapy temperature-time profile, within at preset temperature tolerance value.

  

2. The apparatus of claim 1 wherein said means to select and set a constant therapy temperature includes microprocessor-based control electronics and associated operating program, connected to user-operated push-button controls and a digital display, said push-button controls and said digital display enabling the user to manually select and visually confirm a constant therapy temperature, said control electronics and associated operating program capable of storing and retrieving the constant therapy temperature for purposes of implementing closed-loop therapy temperature control.

3. The apparatus of claim 1 wherein said means to program and store one or more therapy temperature-time profiles includes microprocessor-based control electronics and associated operating program, connected to user-operated push-button controls and a digital display, said push-button controls and said digital display enabling the user to manually select and visually confirm a therapy temperature-time profile, said control electronics and associated operating program capable of storing and retrieving the therapy temperature-time profile and determining the time-varying therapy temperature specified in the therapy temperature-time profile in real time for purposes of implementing closed-loop therapy temperature control.

4. The apparatus of claim 1 wherein said means to control the therapy temperature at a substantially constant value, or to follow with substantial accuracy a therapy temperature-time profile, includes microprocessor-based control electronics and associated operating program, said control electronics and associated operating program connected to said means to measure and monitor with substantial accuracy the therapy temperature applied at the therapy site or sites and having the capability of comparing the therapy temperature applied at the therapy site or sites to a constant therapy temperature, or to a time-varying therapy temperature specified in a therapy temperature-time profile in real time, for purposes of implementing closed-loop therapy temperature control, said control electronics also connected to the electric-powered fluid pump/heat exchanger. The fluid pump/heat exchanger having its fluid input connected to a reservoir containing cooled/heated fluid and the

returning circulation water. The mixing of the reservoir and returning water is controlled via the control electronics to provide output water at a constant selected temperature. The controlled

5 temperature fluid output is connected to the bladder device via the supply tubes having the capability of pumping fluid from said heat exchanger to said bladder device when operated.

10 5. The apparatus of claim 1 wherein said means to measure and monitor with substantial accuracy the therapy temperature applied at the therapy site or sites includes microprocessor-based control electronics and associated operating program and two thermistors

15 connected to said control electronics, one said thermistor mounted in each of two supply tubes supplying circulating fluid to a bladder device, said control electronics and associated operating program monitoring the output of said thermistors and computing

20 the actual circulation fluid temperature detected by said thermistors for purposes of implementing closed-loop therapy temperature control via the pump/heat exchanger.

25 6. The apparatus of claim 1 wherein said means to apply tactile stimulation at the therapy site or sites includes an electric-powered fluid pump, said fluid pump connected to microprocessor-based control electronics and associated operating program, said

30 fluid pump having its fluid input connected to a heat exchanger containing controlled temperature fluid and its fluid output connected by a fluid supply tube to a bladder device, and having the capability of pumping fluid from said heat exchanger to said bladder device when operated, said control electronics and associated

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operating program periodically modulates the bladder pressure for preprogrammed intervals, thereby periodically imposing near zero pressure on said bladder device thus creating tactile stimulation

5 through the inflation/deflation cycle.

7. The apparatus of claim 1 wherein said means to warn the user whenever the apparatus lacks sufficient cooling/heating capacity to control the therapy

10 temperature at a constant value, or according to a therapy temperature-time profile, within a preset temperature tolerance value, includes two thermistors connected to microprocessor-based control electronics and associated operating program, one said thermistor

15 mounted in each of two supply tubes supplying controlled temperature fluid to a bladder device, said control electronics and associated operating program monitoring the output of said thermistors and producing and audible signal from a sound-emitting device when

20 the temperature detected by said thermistors indicates that the cooling/heating capacity in said reservoir is insufficient for maintenance of the closed-loop therapy temperature control within the preset temperature tolerance value.

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